

Chapter 5. Irreversible and Irretrievable Commitment of Resources

This section describes the amounts and types of resources that would be irreversibly and irretrievably committed if the proposed expansion of the SPR is undertaken. The principal resource that would be committed to SPR expansion is the land that would be required for the construction and expansion of the proposed sites, pipeline ROWs, and marine terminals. Construction of storage caverns in the salt domes at the proposed new and expansion sites would also result in the irretrievable loss of the salt, which would be either discharged as brine to the Gulf of Mexico or disposed of by underground injection, and irretrievable use of the water needed to dissolve the salt. Additional water would be used during drawdown. Other resources that would be committed to the proposed new and expansion sites include construction materials (e.g., steel, concrete) and energy (e.g., electricity, fuel) used for construction and operation.

5.1 LAND RESOURCES

The amount of land that would be committed during construction of the proposed new and expansion sites would include land used for the SPR site construction, pipeline construction ROWs, RWI structure construction, tank farm, and other terminal construction, and, to a lesser extent, road construction. While not all the acreage required for SPR construction would actually be developed, standard security measures require that the entire site be enclosed in fencing. This would effectively preclude use of the fenced-in land for the duration of the operation.

The land required for proposed new and expansion site and pipeline construction would include both uplands and wetlands. Temporary easements would be required during pipeline construction, and permanent easements would be maintained for the pipeline ROWs. Permanent easement lands would be considered to be irretrievable resources. Temporary easement lands would not ordinarily be considered as irretrievable resources; however, impacts to temporary easement lands during construction would be degraded for the duration of the SPR operation. The total acreage that would be committed for each proposed new and expansion site, including both temporary and permanent easements, is shown in table 5.1-1, and the total acreage that would be committed for each alternative is shown in table 5.1-2. (See chapter 2 for more information on the alternatives). The land area of the temporary easements for pipeline construction is approximately 50 percent of the total area of the crude oil, brine, and raw water pipeline ROWs.

For the proposed Clovelly site, the proposed caverns would be co-located with the existing Clovelly LOOP caverns and would be largely submerged. Affected areas for the proposed Clovelly site include dredged and filled areas. The total area of the Clovelly site is shown in tables 5.1-1 and 5.1-2. For the Bayou Choctaw and Big Hill sites, the land required for expansion would be the same regardless of the additional storage capacity and number of additional storage caverns. The West Hackberry site would either be expanded through acquisition of three existing storage caverns or not expanded at all. The total area of the West Hackberry site shown in tables 5.1-1 and 5.1-2 includes the disturbed areas and buffer for the proposed expansion but does not include an additional 240 acres (97 hectares) of land adjacent to the existing West Hackberry site that would be purchased by DOE but not developed.

Table 5.1-1: Commitment of Land for Proposed New and Expansion SPR Sites (acres)

Site	MMB	SPR Site Construction and Buffer	Terminal, Pump Station, and Tank Farm	RWI Structure	Power Line ROW	Crude Oil Pipeline ROW	Brine Pipeline ROW	Brine Injection Well Area	Raw Water Pipeline ROW	Access Road Area	Total Land Area
Bayou Choctaw	20	0	0	0	0	0	7	96	0	2	105
	30	2	0	0	0	0	7	96	0	2	107
Big Hill	108	206	0	0	0	278	16	0	0	0	500
	96	206	0	0	0	278	16	0	0	0	500
	84	206	0	0	0	278	16	0	0	0	500
	80	206	0	0	0	278	16	0	0	0	500
	72	206	0	0	0	278	16	0	0	0	500
Bruinsburg	160	365	141	1	194	1,742	214	73	7	47	2,784
	80	254	71	0.8	234	813	128	36	7	22	1,566
Chacahoula	160	320	0	1	382	899	553	0	28	15	2,198
Clovelly	120	0	4	1	0	0	0	0	0	0.4	5
	90	0	4	1	0	0	0	0	0	0.4	5
	80	0	4	1	0	0	0	0	0	0.4	5
Richton	160	350	130	1	201	3,060	0	0	56	10	3,808
Stratton Ridge	160	371	39	1	45	911	9	0	125	4	1,505
West Hackberry	0	0	0	0	0	0	0	0	0	0	0
	15	81	0	0	0	0	0	0	0	0	81

Table 5.1-2: Commitment of Land for Proposed New and Expansion SPR Alternatives (acres)

Alternative	SPR Site Construction and Buffer	Terminal, Pump Station, and Tank Farm	RWI Structure	Power Line ROW	Crude Oil Pipeline ROW	Brine Pipeline ROW	Brine Injection Well Area	Raw Water Pipeline ROW	Access Road Area	Total Land Area
Bruinsburg w/3 Expansion Sites	652	141	1	194	2,020	237	169	7	49	3,470
Bruinsburg w/2 Expansion Sites	571	141	1	194	2,020	237	169	7	49	3,389
Chacahoula w/3 Expansion Sites	607	0	1	382	1,177	576	96	28	17	2,884
Chacahoula w/2 Expansion Sites	526	0	1	382	1,177	576	96	28	17	2,803
Clovelly	289	4	1	0	278	23	96	0	2	693
Clovelly 80 MMB-Bruinsburg 80 MMB w/3 Expansion Sites	335	75	1.8	234	813	135	132	7	24	1,757
Clovelly 80 MMB-Bruinsburg 80 MMB w/2 Expansion Sites	460	75	1.8	234	1,091	151	132	7	24.4	2,176
Clovelly 90 MMB-Bruinsburg 80 MMB w/3 Expansion Sites	541	75	1.8	234	1,091	151	132	7	24	2,257
Clovelly 90 MMB-Bruinsburg 80 MMB w/2 Expansion Sites	460	75	1.8	234	1,091	151	132	7	24	2,176
Richton w/3 Expansion Sites	637	130	1	201	3,338	23	96	56	12	4,494
Richton w/2 Expansion Sites	556	130	1	201	3,338	23	96	56	12	4,413
Stratton Ridge w/3 Expansion Sites	658	39	1	45	1,189	32	96	125	6	2,191
Stratton Ridge w/2 Expansion Sites	577	39	1	45	1,189	32	96	125	6	2,110
No Action	0	0	0	0	0	0	0	0	0	0

Notes:

1 acre = 0.405 hectare

5.2 WATER RESOURCES

There are three primary uses of water during site construction and operation: cavern leaching, cavern fill, and drawdown. Water used for both leaching and drawdown would be discharged or disposed of as brine. Such water use is considered an irretrievably committed resource for each of the proposed new and expansion sites. No significant water resources would be required for construction of the pipelines or terminals or for SPR operations other than fill and drawdown. Leaching requires a volume of water equal to approximately seven times the potential storage capacity of the leached cavern, in other words, seven barrels of water will create storage capacity for one barrel of oil. Quantities of water that would be required for leaching storage caverns for each site and for each alternative are shown in table 5.2-1 and table 5.2-2. Storage cavern fill and drawdown cycles require a water volume approximately equal to the displaced volume of oil (i.e., one barrel of water/one barrel of oil). Water requirements for fill/withdrawal for each alternative are also shown in table 5.2-1 and table 5.2-2, assuming five drawdown/fill cycles over the operating life of each proposed new and expansion SPR site.

5.3 MATERIAL AND ENERGY RESOURCES

Material and energy resources committed for development of the SPR expansion sites would include construction materials (e.g., steel and concrete), electricity, fuel (e.g., diesel and gasoline), salt, and crude oil through evaporation losses during cavern fill, storage, and drawdown. All energy used during construction and operation would be irretrievable. Relative to the potential energy stored in the form of crude oil in the caverns, the energy consumed during construction and operation would be very small. In addition, the amount of crude oil lost to evaporation during fill, storage, and drawdown would be small.

The amount of construction materials used in constructing the proposed new and expansion SPR sites would also be small as compared to overall consumption of construction materials. The salt, which is potentially economically valuable, would be leached from the caverns and disposed of as brine and its economic value would be irreversibly lost. The amount of salt lost during cavern leaching would have a volume equal to the storage capacity of the oil storage caverns. The volume of salt that would be lost during leaching may be estimated from the cavern volume using an average density of 2.16 grams per cubic centimeter (135 pounds per cubic foot). For a single 10 MMB storage cavern, the volume of salt is equivalent to 3.4 million metric tons (3.7 million short tons) of salt. For all of the alternatives, the amount of salt lost would be approximately 95 million metric tons (105 million short tons).

Table 5.2-1: Water Required for Construction and Operation of Proposed New and Expansion SPR Sites (MMB)

Site	Capacity	Leaching	Fill/Withdrawal	Total
Bruinsburg	160	1,120	800	1,920
Chacahoula	160	1,120	800	1,920
Clovelly	120	840	600	1,440
Clovelly 80 MMB and Bruinsburg 80 MMB	160	1,120	800	1,920
Clovelly 90 MMB and Bruinsburg 80 MMB	170	1,190	850	2,040
Richton	160	1,120	800	1,920
Stratton Ridge	160	1,120	800	1,920
Bayou Choctaw	20	140	100	240
Bayou Choctaw	30	140	150	290
Big Hill	108	756	540	1,296
Big Hill	96	672	480	1,152
Big Hill	84	588	420	1,008
Big Hill	80	560	400	960
Big Hill	72	504	360	864
West Hackberry	0	0	0	0
West Hackberry	15	0	75	75

Table 5.2-2: Water Required for Construction and Operation of SPR Expansion Alternatives (MMB)

Alternative	Capacity	Leaching	Fill/Withdrawal	Total
Bruinsburg w/3 Expansion Sites	275	1,820	1,375	3,195
Bruinsburg w/2 Expansion Sites	276	1,932	1,380	3,312
Chacahoula w/3 Expansion Sites	275	1,820	1,375	3,195
Chacahoula w/2 Expansion Sites	276	1,932	1,380	3,312
Clovelly	273	1,736	1,365	3,101
Clovelly 80 MMB-Bruinsburg 80 MMB w/3 Expansion Sites	275	1,820	1,375	3,195
Clovelly 80 MMB-Bruinsburg 80 MMB w/2 Expansion Sites	276	1,932	1,380	3,312
Clovelly 90 MMB-Bruinsburg w/3 80 MMB Expansion Sites	277	1,834	1,385	3,219
Clovelly 90 MMB-Bruinsburg w/2 80 MMB Expansion Sites	274	1,918	1,370	3,288
Richton w/3 Expansion Sites	275	1,820	1,375	3,195
Richton w/2 Expansion Sites	276	1,932	1,380	3,312
Stratton Ridge w/3 Expansion Sites	275	1,820	1,375	3,195
Stratton Ridge w/2 Expansion Sites	276	1,932	1,380	3,312
No-Action	0	0	0	0

[This page intentionally left blank]